

REMARKS

Claims 1-15, 17, and 20-24 have been cancelled. Claims 16, 18, 25, and 26 have been amended. New Claims 27-54 have been added.

Claim Objections:

Claims 5, 7-16, 18-19, and 25-26 were objected to because of informalities. Claims 5, and 7-15 have been cancelled, thus objection to those claims is rendered moot. As for the remaining claims, Applicant has amended claims 16, 18 and 26 to correct the informalities cited by the examiner. Therefore, removal of the objections to these claims is respectfully requested.

Allowable Subject Matter:

The Office Action objected to claims 2-4, 6-7, 10-12 and 14, as being dependent upon a rejected base claim, but indicated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant appreciates the allowed subject matter, but also believes that the claims as currently presented are patentably distinct over Kraus (U.S. 5,852,376). However, in order to expedite prosecution, Applicant has cancelled claims 1-15, 17, and 20-24, and added new claims 27-54 to capture the allowed subject matter. More specifically, new independent claim 27 includes the limitations of previously presented claims 1 and 7, new independent claim 34 includes the limitations of previously presented claims 9 and 10, new independent claim 40 includes the limitations of previously presented claims 1 and 2, new independent claim 47 includes the limitations of previously presented claims 1 and 6, and new independent claim 50 includes the limitations of previously presented claims 9 and 14. Applicant respectfully submits that no new matter has been entered in the new claims, and so the new claims do not raise any new issues. In addition, Applicant reserves the right to pursue the previously claimed subject matter in a continuation application.

35 U.S.C. § 103 Rejection:

Claim 16, 18-19, and 25-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kraus. Claims 16, 18-19, and 25-26 were also rejected under 35 U.S.C. § 103(a) being unpatentable over Nakai.

Applicant has amended claim 16 to more clearly and distinctly claim the subject matter that the Applicant regards as the invention.

As currently amended, independent claim 16 recites:

16. A method comprising:
generating a constant reference voltage;
generating a threshold voltage component, wherein the threshold voltage component approximates a threshold voltage of an NMOS process over variations in operating temperature and/or variations in transistor fabrication parameters;
generating a composite voltage that is a sum of the constant reference voltage and the threshold voltage component; and
applying the composite voltage to a gate of a tail current transistor of a differential input stage, thereby producing an offset voltage of the differential input stage that is substantially independent of the operating temperature and/or the variations in transistor fabrication parameters;
wherein the offset voltage of the differential input stage is proportional to the constant reference voltage.

The cited references do not teach or suggest a differential input stage with an offset voltage that is “proportional to the constant reference voltage”. Applicant would like to point out that new claims 47 and 50, which contain allowable subject matter, both recite that “the second component of the voltage provides constant effective voltage

(Veff), for the tail current transistor, the tail current transistor thereby producing the tail current (It), proportional to an NMOS process beta parameter according to: $I_t = (\beta/2) \cdot (V_{eff})^2$. As stated in paragraph 37 on page 14 of Applicant's specification, "Since the sum of the leg currents may combine to form the tail current, It, through NMOS 520, the current through each leg may be It/2. Summing the gate-source voltages for NMOS transistors 526 and 528 yields: $V_{in\ 532}$ (at the trip point) equals V_t plus $\sqrt{I_t/\beta}$ minus V_t minus $\sqrt{I_t/N\beta}$. After simplification the expression for the amplifier input voltage at the trip point may become: V_{tp} equals $(1-1/\sqrt{N})\sqrt{I_t/\beta}$." It is further stated in paragraph 40 on page 16 of Applicant's specification that "As was shown previously, the drain-source current through NMOS transistor 520 is the tail current for the voltage detector whose input differential pair includes transistors 526 and 528" and in paragraph 9 on page 4 that "Therefore, the trip point of the voltage level detector, and analogously, the input offset voltage of a differential amplifier may be made highly immune to variations in operating temperature as well as variations in transistor fabrication parameters", therefore establishing the input offset voltage of the differential amplifier (or the offset voltage of the differential input stage) as being analogous to the trip point of the voltage detector.

It is clear that considering the equation for the trip voltage (and analogously the offset voltage) from above, $V_{tp} = (1-1/\sqrt{N})\sqrt{I_t/\beta}$, and substituting for 'It' the expression obtained from the right hand side of equation $I_t = (\beta/2) \cdot (V_{eff})^2$, the following equation equally describes the trip voltage (and analogously the offset voltage):

$$V_{tp} = (1-1/\sqrt{N})\sqrt{1/2} V_{eff}.$$

The equation thus obtained clearly establishes that the offset voltage of the differential input stage (or analogously, the trip point of the voltage level detector) is proportional to the constant reference voltage (or constant effective voltage).

This relationship between the offset voltage and the constant reference voltage is neither characteristic of the cited circuit in Fig. 6 of Kraus, nor of the cited circuit in Fig. 2 of Nakai. In fact, the offset voltage associated with the cited circuits in both Kraus and Nakai is zero.

For at least these reasons, Applicant submits that the combinations of features recited in independent claim 16 are neither anticipated nor rendered obvious by Kraus

and Nakai. Accordingly, Applicant respectfully requests removal of the 35 U.S.C. § 103(a) rejection. Applicant further submits that claims 18-19, and 25-26 are allowable based on their dependence on allowable claim 16.

CONCLUSION

Applicant submits the application is in condition for allowance, and an early notice to that effect is requested.

If any extensions of time (under 37 C.F.R. § 1.136) are necessary to prevent the above referenced application(s) from becoming abandoned, Applicant(s) hereby petition for such extensions. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert & Goetzel PC Deposit Account No. 50-1505/5707-04100/JCH.

Also enclosed herewith are the following items:

- ☒ Return Receipt Postcard
- ☒ Request for Continued Examination

Respectfully submitted,



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